

palp, and in having the spine of the palpal organ slender and subfiliform.

The Museum is indebted to Dr. A. Dugès for the specimen here referred to *M. Breyeri*, Becker (Ann. Soc. Ent. Belg. xxi. p. 77, pl. ii. figs. 1-6, 1878), from Guanajuato, the original and only known locality for the species.

The males of the species of *Metriopelma* represented in the British Museum may be tabulated as follows:—

- | | | |
|------------------|---|--------------------|
| a. | Eyes of anterior line strongly procurved, posterior edge of laterals far in advance of centres of medians; palpus short, not extending beyond distal end of patella of first leg..... | <i>auronitens.</i> |
| b. | Eyes of anterior line less strongly procurved, posterior edge of laterals at most a little in advance of the centres of the medians; palp surpassing patella of first leg. | |
| a ¹ . | Palp very long, twice as long as carapace and extending as far as apex of tibia of first leg..... | <i>Breyeri.</i> |
| b ¹ . | Palp short, less than twice the length of carapace, and not surpassing middle of tibia of first leg. | |
| a ² . | Tibia of palp longer and thicker than patella of first leg; weakly spined internally, but spined above at apex..... | <i>velox.</i> |
| b ² . | Tibia of palp not longer and thicker than patella of first leg; strongly spined internally, but not above at apex. | |
| a ³ . | Tibia of palp with about a dozen spines, of first leg with about fifteen spines..... | <i>tetricum.</i> |
| b ³ . | Tibia of palp with about twenty-three spines, of first leg with about twenty-five spines..... | <i>trinitatis.</i> |

XIV.—On some Pleurodiran Chelonians from the Eocene of the Fayum, Egypt. By C. W. ANDREWS, D.Sc., F.G.S. (British Museum, Natural History).

[Plates VII. & VIII.]

IN the present paper I propose to give a short account of some Pleurodiran Chelonians collected from the Middle and Upper Eocene beds in the Fayum during the last two seasons. One member of the group, *Stereogenys Cromeri*, has already been described, but from the skull only, and a description of the carapace and plastron probably belonging to that species is given below.

Stereogenys libyca, sp. n. (Pl. VII.)

One of the finest specimens collected during my expedition to the Fayum in the spring of the present year (1902) is a

nearly complete carapace and plastron of a tortoise from the Upper Eocene beds from which *Palæomastodon* and *Arsinoitherium* have been obtained. This specimen was found in slightly compacted sand, close to one of the numerous groups of logs of silicified wood which form such a characteristic feature on the surface of beds of this age in the region in question. The shell was lying somewhat on its side, so that the left-hand edge was exposed and had been partly removed by the sand-drift, but the rest, comprising considerably more than three fourths of the shell, was preserved, and the pelvic bones were in position. Both carapace and plastron, however, were cracked in every direction, so that it was very difficult to remove the specimen without further injury; at the same time the shell is quite undistorted by pressure and gives an accurate idea of the form of the living animal.

In its general shape this Chelonian resembles *Podocnemis madagascariensis*, but is rather more convex, particularly in the region covered by the last vertebral shield, where there is a well-marked prominence. The carapace is slightly expanded posteriorly.

The Carapace (Pl. VII. fig. A).—There are seven neural bones, the series being separated from the nuchal in front and the suprapygal behind by the union in the middle line of the anterior and posterior pairs of costals respectively. The distance between the anterior neural and the nuchal is 46 millim., that between the posterior neural and the suprapygal 19 millim. The anterior neurals are much longer than wide, but they shorten from before backward, so that the posterior ones are wider than long. They are hexagonal in outline (except the first and last, which are pentagonal owing to the suppression of the anterior and posterior faces respectively), and in the anterior ones the antero-lateral border is much shorter than the postero-lateral.

There are eight pairs of costals; as already mentioned, the anterior and posterior pairs meet in the middle line. The nuchal (*Nu.*) is large and is wider than long; its anterior border is emarginate. There are eleven pairs of marginals, of which 4, 5, 6, and 7 form the base of the bridge, and 5 and 6 unite with the mesoplastral (*Ms.p.*). The anterior buttress is opposite the fourth marginal, the posterior one opposite the seventh. The anterior marginals have a rounded edge; the posterior are somewhat expanded and have a sharp edge. The pygal is notched in the middle line by the furrow separating the posterior pair of marginal shields. The suprapygal (*Pyg.*) occupies the summit of the posterior prominence above referred

to; it is roughly triangular in outline, with rounded angles, and is nearly the same shape as the overlying vertebral shield.

There are five vertebral shields (*v.*), the anterior of which is very narrow, much narrower than the underlying nuchal bone; in the recent *Pelomedusa* and *Podocnemis*, the only genera it is necessary to consider in this connexion, the reverse is the case. The remaining plates are roughly hexagonal, the antero-lateral being slightly shorter than the postero-lateral one. The posterior shield, as already mentioned, is very convex; it is nearly the same shape as the underlying suprapygial, but much larger (see Pl. VII. figs. A & C). The costal shields are four in number, the marginals twelve. There is no nuchal shield. On the anterior border of the carapace the extent to which the marginals are exposed is very small, but posteriorly, where the carapace is somewhat expanded, the area is much greater.

The Plastron (Pl. VII. fig. B).—The posterior lobe of the plastron is wider than the anterior and the length of the bridge is about the same as the width of the front lobe.

The entoplastron (*Ent.*) is a relatively small escutcheon-shaped bone, from the outer angles of which the sutures between the epi- and hyoplastra run forward at an angle of about 45° with the long axis of the shell and cut the border of the plastron in the notch marking the end of the groove between the humeral and pectoral shields. The suture between the hyo- and hypoplastra (*Hy.p.* and *Hyp.p.*) crosses at the level of the middle of the bridge and terminates externally at the inner angle of the mesoplastra (*Ms.p.*), which are thus wedged in between the marginals 5 and 6 and the inner ends of the hyo- and hypoplastra. The mesoplastra are considerably longer than broad. The suture between the hypo- and xiphiplastra (*Xi.p.*) runs parallel to and about 3 centim. in front of the groove between the femoral and anal shields. There is a deep rounded notch between the posterior ends of the xiphiplastrals.

The intergular shield (*ig.*) is very large and extends back as far as the middle of the entoplastron, separating both the gulars and the humerals. This condition, as far as I know, occurs in no other Pleurodiran except in the shell described below and referred provisionally to *Stereogenys Cromeri*. Both the gulars (*g.*) and the humerals (*n.*) are very small; the pectorals (*pect.*), on the other hand, are very large, the suture between them and the abdominals runs across about 3 or 4 centim. behind the anterior end of the bridge. The limits between the abdominals and the femorals and between the latter and the anals are shown in the figure.

The grooves marking the boundaries of the epidermal shields are fairly clearly marked both on the carapace and plastron.

The upper surface of the hinder region of the plastron bears the bases of the ischia and pubes, which are closely united with it, in the manner characteristic of the Pleurodira. When found the pelvic girdle was *in situ*, but was broken away in removal. As far as can be seen, the pelvis differs in no essential respect from that of *Podocnemis*.

Systematic Position.—The presence of mesoplastra shows that this tortoise is referable to the Pelomedusidæ, and the small size and lateral position of those elements further show a close relationship with *Podocnemis* and *Pelomedusa*. The large size of the plastron and the width of the bridge between it and the carapace indicate a closer relationship with the former of these two genera than with the latter: indeed, at first it seemed possible to refer this species to *Podocnemis*, but further consideration, aided by the advice of Mr. G. A. Boulenger, leads to the conclusion that its generic separation is justifiable. The chief points in which it differs from *Podocnemis* are:—

- (1) The narrowness of the anterior vertebral shield, which is narrower than the underlying nuchal.
- (2) The large size of the intergular and the separation of the gulars and humerals by it.
- (3) The separation of the series of neural bones both from the nuchal in front and the suprapygial behind.
- (4) The comparatively slight degree to which the buttresses are developed.
- (5) Another point that may be of some significance is that in the fossil the anterior border of the plastron is not convex but concave, though to a slight extent only, and behind the antero-lateral angles the bone is considerably thickened, so that the upper surface of the plastron is gently concave from side to side in the middle line, the shallow depression being bounded by the thickened ridges just mentioned.

All these characters except the first (which, owing to the imperfection of the specimens, cannot be observed) occur in the Chelonians from the Middle Eocene which are described below and referred to *Stereogenys Cromeri*, because they are found both on the same horizon and in the same locality as the skulls on which that species was founded, and with them are the commonest of the Chelonian remains. The present species, also, will therefore be referred provisionally to the same genus and its specific name will be *Stereogenys libyca*; it differs from

S. Cromeri in the narrower form of the shell and the different shape of the entoplastron; moreover, the beds in which it is found are much later, and all the species of mammals in them are different from those occurring in the lower beds.

The small development of the buttresses compared with those found in *Podocnemis* and other recent Pleurodirans, as well as the form and the thickening of the anterior portion of the plastron, may indicate that this species and that next described were more terrestrial in their habits than the modern members of the group.

The dimensions of the type specimen of *Stereogenys libyca* are:—

	centim.
Length of carapace in the middle line	41·5
Greatest length of plastron	40
Length of plastron in middle line	36·5
Width of anterior lobe of plastron.....	17·4
" posterior " " 	20·5
Length of bridge	17·7
Approximate width of shell	32

Stereogenys Cromeri, Andrews *. (Pl. VIII. fig. 1, A & B.)

The specimens from the Middle Eocene just mentioned as being referred to *Stereogenys Cromeri*—a species founded on a skull and mandible—were collected last year by Mr. H. J. L. Beadnell and myself in the neighbourhood of Qasr-el-Sagha (Schweinfurth's Temple). Portions of the shell of this Chelonian are, like the fragmentary skulls, common in these beds, and in one case a nearly complete, though somewhat crushed, shell was found; this specimen is here described. It is unfortunate that in these deposits the shells are usually more or less thickly coated with gypsum and other substances, which greatly obscure and often entirely conceal the lines of division between the various plates and shields.

In the nearly complete shell the carapace has been to some extent flattened and, at the same time, widened by pressure. Its dimensions in its present state are:—Length in a straight line 46·5 centim., width 41·5.

The Carapace (Pl. VIII. fig. 1, A).—The number of neural bones cannot be determined, but it seems certain that, as in the last species, the neural series is separated both from the nuchal and pygal bones by the junction in the middle line of the anterior and posterior pair of costals respectively. There are eight pairs of costal plates, but the number of marginals

* "Preliminary Note on some recently discovered Extinct Vertebrates from Egypt. (Part II.)" Geological Magazine, dec. iv. vol. viii. (1901), p. 442.

cannot be made out. The nuchal bone is large and its anterior border is emarginate.

Scarcely any trace of the outlines of the epidermal shields remains, but the two middle vertebrae seem to have been large and roughly hexagonal in outline.

The Plastron (Pl. VIII. fig. 1, B) —The plastron is large; its total length is about 44 centim.; the length of the bridge is 20·5; the width of the anterior lobe 24; the width of the posterior lobe 24. The entoplastron (*Ent.*) is large and rhomboidal, and the sutures between the epi- and hyoplastrals running out from its outer angles terminate on the edge of the plastron in the groove between the humeral and pectoral shields, as in the last species. The suture between the hyo- and hypoplastrals (*Hy.p.* and *Hyp.p.*) crosses the middle of the bridge and terminates in the inner angles of the small rhomboidal mesoplastrals (*Ms p.*), which are wedged in between the marginals and the outer ends of the hyo- and hypoplastrals. The position of the suture between the hypo- and xiphoplastrals is shown in fig. 1 B, Pl. VIII. The posterior portion of the plastron seems to have been notched much as in *Stereogenys libyca*, but none of the specimens are quite complete in this region.

The arrangement of the horny scutes in the plastron is similar to that seen in *S. libyca*, the intergular (*ig.*) being very large and separating both the gulars (*g.*) and the humerals (*n.*); it extends as far back as the middle of the entoplastron. The other shields present no important peculiarity so far as can be seen. As remarked above, there can be little or no doubt that the Chelonian just described and *Stereogenys libyca* belong to the same genus; but there is some doubt as to whether the shell here referred to *S. Cromeri* really belongs to that species, the type of which is a skull and mandible (see *Geol. Mag.* 1901, p. 442). Although, however, the skull has never been found actually associated with the shell now described, the probability that they belong to one and the same animal is so great that it is certainly advisable to refer them to one species until the contrary can be proved.

Podocnemis antiqua, sp. n. (Pl. VIII. fig. 2, A & B.)

Another Pleurodiran tortoise of smaller size was collected from the Middle Eocene beds. This species differs considerably from that just described both in its general form and in some points in the structure of its shell. The carapace is shorter and broader and more highly arched anteriorly; the nuchal border is quite straight, there being no trace of any emargination. Posteriorly the carapace is less convex and

from *Stereogenys libyca* in the arrangement of the epidermal shields of the plastron, the anterior portion of which is shown in the figure. It will be seen that the intergular shield (*ig.*) is very small, and instead of separating both the gular (*g.*) and humeral (*n.*) shields, it does not even completely separate the gulars, which meet in the middle line for some distance. The entoplastron is also different from that of *S. libyca*, being a diamond-shaped bone. There is a small laterally-placed mesoplastron. As far as at present known, there seems to be no reason for not referring this Chelonian to the genus *Podocnemis*, and the name *Podocnemis fajumensis* may be adopted for it. The specimen figured was collected by Mr. Beadnell in the season of 1902.

The approximate width of the plastron figured, immediately in front of the bridge, is 11.5 centim.

The Chelonian fauna of the Middle and Upper Eocene beds of the Fayum seems to be a very rich one, for, although the region is still very imperfectly known, a considerable number of species, including representatives of all the main groups, have already been discovered. From the Middle Eocene we have *Psephophorus eocænus*, *Thalassochelys libyca*, *Stereogenys Cromeri*, and *Podocnemis antiqua*, which occur associated with the mammalian genera *Mæritherium*, *Barytherium*, *Eosiren*, and *Zeuglodon*, and with the Ophidians *Gigantophis* and *Pterosphenus* (*Mæriophis*). From the Upper Eocene in addition to *Stereogenys libyca* and *Podocnemis fajumensis* there is a gigantic land-tortoise, apparently allied to *Testudo perpintiana*, Deperet, which will be described elsewhere; associated with these Chelonians occur remains of *Paleomastodon*, *Arsinoitherium*, *Phiomia*, *Saghatherium*, &c.

EXPLANATION OF THE PLATES.

PLATE VII.

Stereogenys libyca (type specimen). A, carapace; B, plastron; C, right side of shell. About $\frac{1}{2}$ natural size.

PLATE VIII.

Fig. 1. Stereogenys Cromeri. A, carapace; B, plastron. About $\frac{1}{2}$ natural size.

Fig. 2, A & B. Podocnemis antiqua (type specimen). A, carapace; B, plastron. About $\frac{1}{3}$ natural size.

Fig. 2, C. Podocnemis fajumensis (type specimen). Anterior portion of plastron. $\frac{1}{3}$ natural size.

Ent., entoplastron; *Ep.*, epiplastral; *Hy.p.*, hyoplastral; *Hyp.p.*, hypoplastral; *Nu.*, nuchal bone; *Ms.p.*, mesoplastral; *Pyg.*, suprapygal; *Xi.p.*, xiphiplastral; *g.*, gular shield; *ig.*, intergular shield; *n.*, humeral shield; *p.*, pectoral shield; *v.*, vertebral shield.